

Structural Analysis of *Rongorongo* Inscriptions*

Paul Horley

Chernivtsi National University, Ukraine

My investigation of *rongorongo* script reveals numerous parallel passages (e.g. Butinov and Knorozov 1956:84, Barthel 1958:156-7, Pozdniakov 1996:295, Fischer 1997:283), and these allow me to suggest possible allographs and also to define the reading order of the complex signs (e.g. Métraux 1940:402, Guy 1982:447, Pozdniakov 1996:297, Horley 2005:110). At the same time, frequent repetitions in the small surviving *rongorongo* corpus affect the frequency of glyph usage and complicate statistical analyses. A possible solution to this problem may be sought in the detection and removal of repetitive text fragments, extracting the longest continuous "independent text" suitable for further statistical investigation. Simultaneous analysis of internal inscription structure may also help to form an appropriate reference corpus of Rapa Nui legends or songs featuring similar structural properties.

This paper is dedicated to a partial solution of these problems. Tablets, lines and the glyphs' references (three-digit numbers) are given in Barthel's notation; individual glyph elements are mentioned with two-digit codes (Horley 2005:112). Tablet outlines and inscription fragments shown in the figures were traced by the author from the photographs of the original *rongorongo* artifacts (Chauvet 1945, Butinov and Knorozov 1956, Heyerdahl 1975, Fischer 1997, Campbell 1999, and Kjellgren 2001).

STRUCTURAL ANALYSIS

To reveal structurally-similar fragments, the *rongorongo* corpus was transliterated according to the proposed glyph elements catalog and subjected to recurrence plot analysis (Marwan and Kurths, 2002:300). To overcome the problems caused by insertions of short sign groups or possible incorrect identification of glyph element sequences in complex ligatures, multi-pass analyses using textual windows of different lengths were performed and checked for similarity with approximate match criteria. The obtained results were analyzed and unrelated fragments were discarded. This approach clearly detected known parallel fragments (Butinov and Knorozov 1956:83-89, Barthel 1958:151-157, Guy 1982:445-446, Pozdniakov 1996:301, Nicolay 2001) and revealed new (to the knowledge of the author), previously undiscussed sequences, for example the passages shared between the tablets *Atua Mata Riri* and *Tahua*. Due to a more flexible description of individual sign components, our glyph element approach yielded a larger number of related fragments when compared to the approximate string-matching research of the *rongorongo* corpus in Barthel's transliteration (Sproat 2003).

* This paper has been peer reviewed

Structural investigation results for the main *rongorongo* artifacts are summarized in Figure 1, which shows the major shared and repetitive glyph groups. The large St. Petersburg tablet P was selected to represent the "Great Tradition" H/P/Q as the best surviving copy of this text, completed with the lines Hv10-12.

A corresponding chart for the Santiago Staff (artifact I) was not presented because its inscription is structurally different from the main *rongorongo* corpus and does not share its parallel sequences (Pozdniakov 1996:299, Sproat 2003).

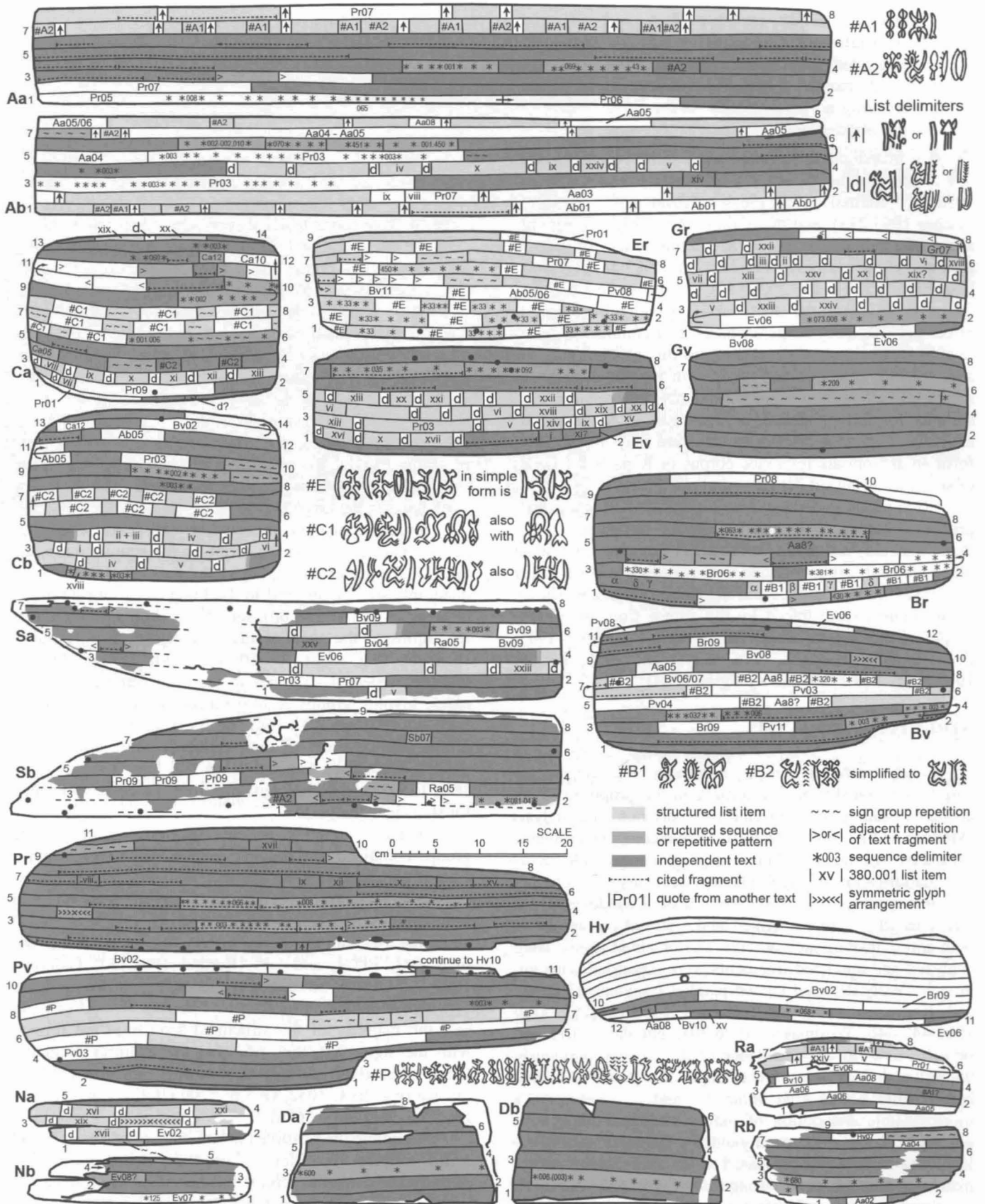
Text K was omitted as a copy of inscription Gr; the artifacts F, J, L, M, O, T-Z were not presented in the figure because of their fragmentary nature.

In order to extract the longest continuous "independent text", the parallel fragments appearing in smaller or much segmented inscriptions were treated as "quotes" citing the "originals" in the texts A, B, and P.

Structural analysis revealed several characteristic repetitive pattern types in the script. In the simplest case, the individual signs or their groups can be repeated in-line (e.g. quadruplicated glyph 790f in the line Gv6, triplicate group 002-060 in Cb9 and so on), sometimes resulting in multiple repetitions of the same textual fragment with only minor variations (e.g. sequence 010f.070-760-040-006a-400-047-002-002, repeated six times in the lines Ca10-12). In rare cases, glyphic groups feature mirror-symmetry (Figure 2, Na3, Pr4 (Barthel 1958:164) and Bv9), assuming the palindrome reading order of their elements; until similar constructions could be found in Rapa Nui lore, it seems to be safer to exclude such fragments from the corpus intended for statistical analysis.

A more complex pattern represents short glyphic groups combined in structured sequences or series with a certain delimiter sign or ligature, including a widely discussed series with the prefix sign 066 in the lines Aa1 and Pr5 (Butinov and Knorozov 1956:88, Guy 1985:368-371) and three lists with the divisor signs 330, 381 and 063 in the lines Br3, Br3/4, and Br6 (Barthel 1958:153, Fedorova 1982:54). Over 40 structured sequences are shown in Figure 1, with the delimiters marked by asterisks "*". As one can see, the majority of the structured sequences are formed with the signs 003, 006, 063 and the ligatures including them; other glyphs usually delimit only one structured sequence (e.g. Bv4: *032, Gv5/6: *200 (Butinov and Knorozov 1956: 89), Rb3: *680).

Assuming the possible phonetic nature of Easter Island script, frequent repetitions of sequence delimiters are expected to be related to certain lexemes of spoken Rapanui. It is natural to search for such parallels amongst the frequently used auxiliary parts of speech (Du Feu 1996:6-14), such as



tense/aspect markers (*he, i, ka, ki, ko*), discourse markers (*te, he*) and particles (vocative *e*, limitative *no* and benefactive *ma, mo*), potentially able to form the similar patterns:

He otea i te poa, he ae, he oho ki Vaitaka Tiki, ki Puku Takaure, ki Ahu Ava a Atea, ki te Henua Kava.

A Tuu ko Ihu (Fedorova 1978:196)

E toto te eki no, kino no, nga roki no, nga renga no, nga tokatoka ruapapa no.

Atua Mata Riri, verse 36 (Fischer 1997:99)

However, the mentioned lexemes usually delimit several words while the structured sequences, in many cases, show the delimiter element appearing after every single glyph/ligature (e.g. Br6, Bv4, Cb1, Db2, Er1-3, Er6, Ev7, Gr2, Pr3, Pr5, Sa6; see also Figure 2 Ab6, a collation of several sequences). This inclines one to think that the frequent delimiter groups could be devoid of phonetic value, probably serving to highlight textual fragments or functioning as taxograms (Guy 2006). Such an impression becomes stronger considering the omission of delimiting elements in parallel passages (Figure 2, Bv4 and Sa5 without suffixed hands at the sequence 001-009-005). From the statistical point of view, frequent delimiters unbalance sign usage frequencies, which could be a serious issue for the small



Figure 2. Examples of mirrored and structured sequences.

surviving *rongorongo* corpus. To reduce this negative influence, it will be appropriate to exclude structured sequences from the text intended for statistical analysis or at least to consider them without delimiting elements.

Another important structural formation of *rongorongo* is the list (Butinov and Knorozov 1956:82), composed of larger textual fragments separated by the stable glyphic groups. To simplify further discussion, we will refer to structured lists using their delimiter group name (Figure1): #B1 = 430-059f-600, line Br2 (discussed by Butinov and Knorozov (1956:84), #B2 = 385-003.065. 200, possibly abbreviated to 385-065.003 (Figure1, Bv5-7), #C1 =

390.041-378y-041-670-008.078.711 – lunar calendar in the lines Ca6-8 (Barthel 1958:243-7), #C2 = 017-006a-381-004-066-760.004 (Figure 1, Cb6-7, probably also Ca4). The whole recto side of the tablet *Keiti* features a list (e.g. Butinov and Knorozov 1956:78) with the delimiter group that gradually abbreviates to #E = 004.430-022.430(380). The “Great Tradition” also features a list-like structure, delimited with passage #P (Figure 1, Pv5-8); concerning a significant number of glyphs comprising delimiter #P, it is reasonable to associate it with some kind of a refrain rather than a fixed introductory text.

Four lines of the tablet *Tahua* are filled with an impressive list delimited with the ligature 001.009:005, also written as 001-009a (Figure 1, “↑”). This delimiter group appears in the text H/P/Q and forms a short list on the tablet R, proving to be a fixed glyphic compound; one may see it also in the parallel sequences Bv4/Sa5 (Figure 2), where its composing elements follow each other in a sequence 001-009-005, suggesting top-down reading of the stacked ligature 001.009:005. The latter could be also confirmed from the paleographic analysis, as the sign 005 appears subscripted to the previously carved glyph 009.

One of the best-studied lists appear in the lines Ab4, Ca2-3, Cb2-4, Ev2-5, Gr2-7, Kr, Kv, Na2-4, Sa1, 3, 4, 6 and characterized with the delimiter group (380).001(.003, 052) (Barthel 1958:304-313), marked with the letter “d” in Figure1, visually similar to a “sitting man holding a stick”

ligature 380.001. Correct identification of the lists as such is confirmed by the presence of list entries quoting the text from other inscriptions, observing that the quotes start and stop exactly at the delimiter group (Figure1, ↑-list: Aa8 referencing to Pr7, Ab2 ref. Aa3, Ab8 ref. Aa4-5; #B2-list: Bv5 ref. Pv4, Bv6 ref. Pv3, Bv07 ref. Bv6; #E-list: Er4 ref. Ab5-6 and Bv11, Er5 ref. Pv8). Items of d-lists represent fixed glyph compounds appearing in *rongorongo* inscriptions outside of the lists, e.g. in the lines Ab3, Ev2, Hv12, Pr7, Pr10, Ra6, Sa5 (Figure1).

From a statistical point of view, structured lists significantly increase the occurrence of the glyphs belonging to their delimiter groups. Moreover, the appropriate comparative statistical study could only be possible in relation to the corresponding Rapa Nui lists (but not legends or songs, which feature different word patterns and vocabulary). Therefore, it is suggested to exclude all the lists from the *rongorongo* corpus intended for the general statistical analysis. Individual items and fixed glyphic groups such as 002-002-080-004 and 280-182-048-022f-025 (Figure 1, #A1, #A2) written outside of the lists and hence belonging to the continuous text are not expected to introduce significant statistics distortion and, in my opinion, are safe to consider.

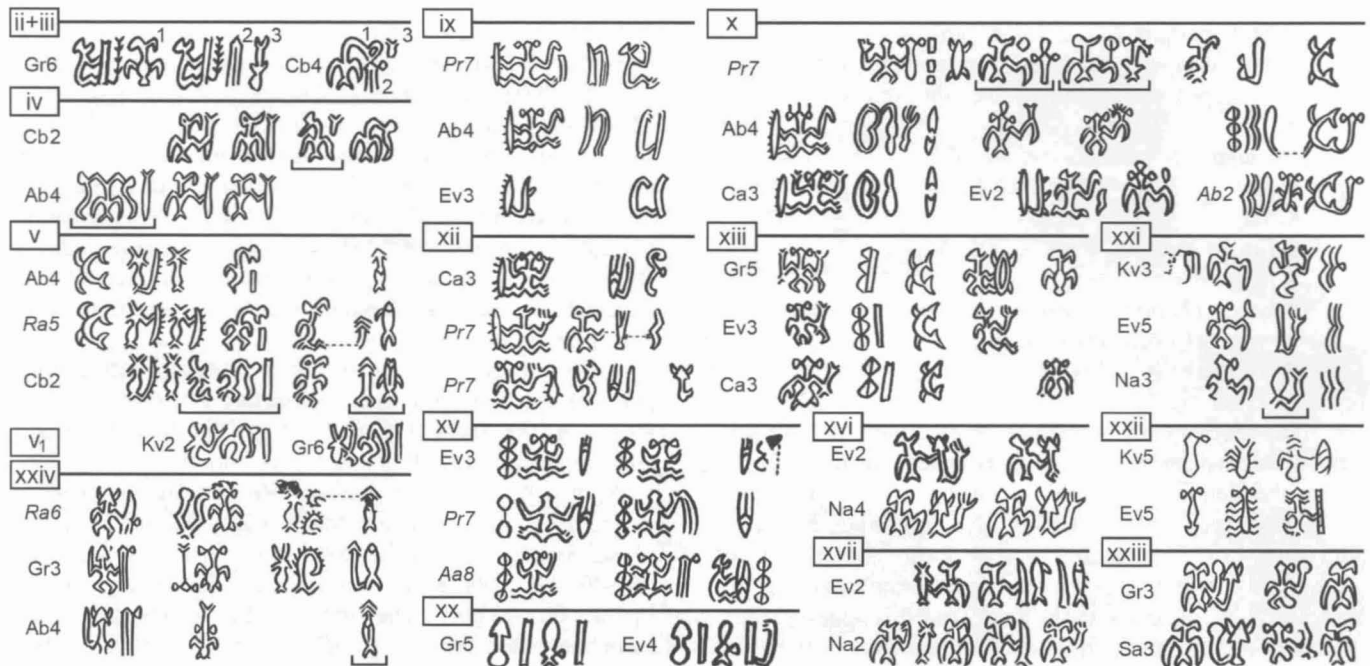


Figure 3. Items of the lists delimited with (380.)001.(003, 052); line numbers of text-embedded items are given in italics.

Therefore, to extract the “independent” *rongorongo* text it seemed appropriate to exclude all the quoted passages, structured sequences, and lists. This reduced the texts considered (number of Barthel glyphs, rounded to the nearest ten) to: A- 690 signs (38% of the original inscription), B- 820 (72%), C- 410 (41%), D- 220 (81%), E- 200 (23%), G- 330 (46%), N- 100 (45%), P- 1140 (74%), R- 200 (43%), S- 430 (60%). In total, for approximately 8920 signs registered by Barthel (1958:14-31) only 4540 signs will remain, roughly one half of the inscriptions.

LISTS WITH THE DELIMITER (380.)001(003,052)

The discussion regarding the repetitive glyphic groups on the Small Santiago tablet depicting “sitting men holding the sticks” dates back to 1874, when Harrison Park assumed this text to contain the names of island chiefs (Fischer 1997:443). Indeed, there are 31 delimiter groups in Gr list, correlating well with the number of *ariki* mentioned in royal genealogies (Routledge 1919:241).

Further investigations revealed d-lists on other tablets with slightly different spelling of the list delimiter (Barthel 1958:304).

It is worth emphasizing that all the surviving d-lists share their items, written with only minor variations. There are some cases of improper list segmentation, suggesting possible delimiter omission (three list items joined together in Kv1, group v₁ forming a subset of the item v (Figure 3) and group vi finalizing a longer entry in the line Ev4 (Figure 1). Items ii and iii are written as separate entries in the line Gv6 (Figure 1), but their elements appear in the same order in the group 660.005-064h, repeated thrice in

the list item ii + iii (Figure 3, Cb4). Several d-list entries feature element or glyph re-grouping (Figure 3, iv, xxiii).

Spelling differences may also constitute a factor in the addition/omission/substitution of a glyph or glyph element (Figure 3, v, xii, xiii, xv-xvii, xx-xxii). Pozdniakov's sequence (item v) and list entry xxiv illustrate a top-down reading of the ligatures 580=069.700 and 066V=122(062.064?)-280 (Figure 3). The first glyphic group of item xxiv features the sequence 001-009-005 (↑-list delimiter) appended with a body in two cases; in the third case it is written as the ligature 010y.599d (Figure 3, Ab4) and probably was intended to look like 001.009:005, but its lower portion was carved in a too small a scale to house the vertical line of the glyph 005, rewritten immediately in the full size.

Five list items viii-xii in the line Ca3 start with the fixed compound 022f.243 (e.g. Figure 3, ix, x, xii). In the text of the tablet *Keiti*, compound 022f.243 is changed to the short ligature 022f.071 (Figure 3, ix); but the list entry x in *Keiti* spelling features a replacement of the sign 243 for 343, confirming that glyph 071 should not be treated as a composing element of sign 243. At the same time, the subscript stick 001t in the item ix (Figure 3, Pr7) appears as a bottom appendage to glyph 243 in the line Ab4, suggesting that the bottom element may read last. Item x provides an illustration for ligature formation: 697ao=407-21h-095g and 207.520fhy = 407-109h-522. The former is strange, because the lozenge head with a circle on top (sign 095g) becomes the head of the preceding sign (Figure 3, Ab4, Ev2), i.e.; it had to be written before the arm. The items starting with 022f.243 items do not appear in the lists Cb, Gr, Na, and Sa, but are mixed together with the entries of the latter in the lists Ab and Ev (Figure 1), making it tempting to think that all the surviving d-lists concern the same subject.

Barthel thought that ligature 380.001 depicted a chanter with a staff reading *kohau rongorongo*, and assumed the list to be a “bibliographic catalog” (1958:310).

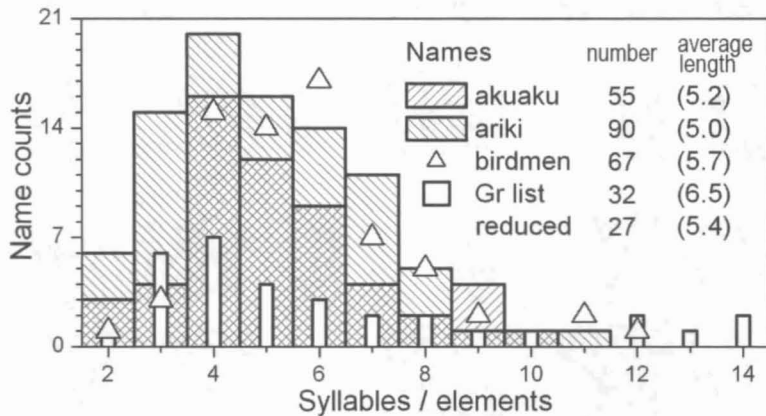


Figure 4. Length of Rapanui names and Gr list items.

Fedorova supposed that the text Gr3/7 represented a list of fugitives (1982:66). Fischer suggested that *rongorongo* lists may contain the names of the kings, birdmen, *akuaku* spirits, or an inventory of the ceremonial *ahu* platforms (Fischer 1997:299, 300).

To corroborate these assumptions in the framework of the hypothesis that each glyph element may render a syllable (Horley 2005:114), I performed a comparative length analysis of *ariki* names (Métreaux 1940: table 2 after p.90), *tangata manu* names (Routledge 1914-15:76, 78, 80), *akuaku* names (Métreaux 1940:318, Englert 1948:168-9, Van Hoorebeeck 1979:204-5), and Easter Island toponyms (Barthel 1962:102-7; Cristino et al. 1981). All the lists considered were cleared of spelling duplicates (e.g. from the birdman names *Ko te Toa Ama Kuko Hau* and *Ko te Toa a Maruku Hau*, the latter was kept as the one with a more correct spelling).

Figure 4 presents the syllabic length histograms for *ariki*, *akuaku* and *tangata manu* names and a histogram of glyph element length of Gr list items. The latter was selected for comparison as it has a longer continuous list with stricter segmentation than that of Ev list items. As one can see, the names of *ariki* and *akuaku* have more similar length distribution, correlating well with the histogram for Gr list items except for five long entries, which could render full names like *Ko Tuu-maheke a Hotu Matua*. Discarding these five entries, we obtain a “reduced” list with the lower average item length 5.4, a better agreement with the average syllabic name lengths (Figure 4).

Similar histograms were built for the total corpus of 1214 Easter Island place names and separately for its ten largest sub-categories, yielding the average length data presented in Table I. The total corpus is characterized with the mean syllabic length of 5.5, while the individual categories vary in length between 5 and 7 syllables, average for placenames, including feature identifiers *maunga*, *vai*, etc. If the list is expected to contain the toponyms of the same type (e.g. caves), one may expect that the feature identifier

will form the delimiter group and should not be accounted for. In this case, the syllabic length of top-ten feature types will lower to 3-4 syllables (Table 1, numbers in parenthesis), shorter than the estimated length of the Gr list items. Therefore, on the base of the statistical investigation, it seems feasible to assume that, for in the framework of glyph subdivision, conventionally used d-lists could contain personal names or place names with a feature identifier included.

However, the delimiter group 80.001.(003,052) might be unrelated to the subject of the list, i.e. *ariki*, *ahu*, etc. Indeed, the Gr list starts with the Pozdniakov sequence *v* standing *before* the first delimiter group and ends with the item *xxii* *after* the last delimiter. At the same time, both entries *v* and *xxii* appear *inside* the list on the tablet *Keiti*, suggesting the infix (rather than suffix or prefix) nature of the delimiter that in this case may have, for example, the meaning of consequence, i.e. “and then”, “followed by”. The similar word pattern can be found in a Rapa Nui lamenting song (Métreaux 1940:177):

*E koro e, ka moemoe koe, tou aringa ena,
Aue taua e, e koro e, e koro kai nui e,
Ika nui e, uhi nui e, kumara nui e,
Koreha nui e, toa nui e, maika nui e,
E koro tae noinoi ki hare era e,
Aue koro e, i ngaroro ai e,
E koro ika nui e, o hau tangitagi e.
Aue taua e.*

Here the items composed of two or three syllables are separated with the underlined “delimiter” *nui e* (meaning “much” or “many” concerning the amount of food provided by the defunct, i.e. not connected with any identifier for

Table 1. Statistical characteristics of Rapanui toponyms.

Feature	Number	Syllabic length
Total toponym corpus	1214	5.5
Ceremonial platforms <i>ahu</i>	305	6.5 (4.5)
Toponyms starting with <i>te</i>	87	5.2 (4.2)
Water springs <i>vai</i>	73	5.4 (3.4)
Caves <i>ana</i>	72	5.8 (3.8)
Bays and inlets <i>hanga</i>	70	5.7 (3.7)
Mountains <i>maunga</i>	55	6.8 (3.8)
Offshore islets <i>motu</i>	36	5.5 (3.5)
Flat lava flows <i>papa</i>	33	5.6 (3.6)
Cliffs <i>puku</i>	30	5.7 (3.7)
Names of the houses <i>hare</i>	28	7.4 (5.4)

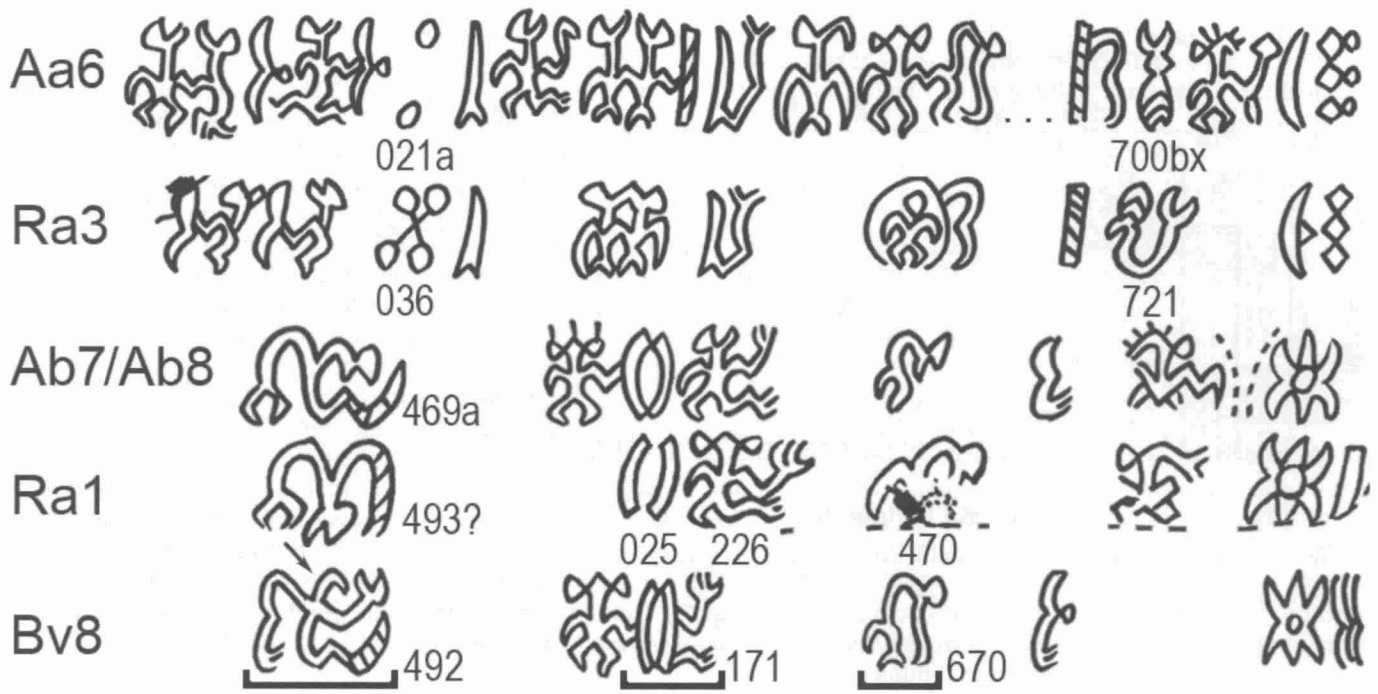


Figure 5. Parallel passages of the tablets A, B, and R.

“food”). Votive *e*, standing alone or together with *nui*, creates another repetitive pattern. The absence of a direct relation between the (380.)001.(003,052) compound and list subject can be also sought in the fact that this delimiter appears only within d-lists except for two possible instances in the line Ca1 (with the staff 011 in the place of 001) and Qv4 (followed by the erased fragment that may have contained the item of d-list). To the contrary, the words like *motu*, *nui*, *ahu*, *ariki* are widely used in Rapa Nui folklore and songs.

ALLOGRAPHIC OBSERVATIONS

Numerous parallel passages in Easter Island script form a fruitful field for further investigations aimed toward revealing allographs and defining the reading order for complex ligatures.

I would here like to discuss the passages shared between texts A and R (Figure 5). The parallel fragment Aa6/Ra3 illustrates re-grouping of the leading anthropomorphs holding glyphs 044, simplification of the sign 036 to a single pair of circles 021a, and suggests that glyphs 700 and 721 are related, which may equally mean that the former is a two-element compound or the latter represents elaborate calligraphic form of sign 700.

Short parallel passages written in the lines Aa6, Ab7-8, Ra1 (traced after the computer-enhanced photo from Kjellgren 2001:76), and Bv8 deserves special attention (Figure 5). They illustrate the allographic nature of the signs, depicting a strange-looking animal, which appears to be composed from the same three elements 10, 49 and 19 (11?). Glyph 492 is prefixed with a leg, but the claw-like

<i>E Ure a Vai a Nuhe!</i>	<i>E Ure a Vai a Nuhe!</i>
<i>Ku tikea te aha,</i>	<i>Ku a aha? Ku a tikea</i>
<i>te rakutia,</i>	<i>te rakutia,</i>
<i>Maikuku, meamea oou</i>	<i>Maikuku meamea</i>
<i>E Ure e, te repa e!</i>	<i>E Ure te repa e!</i>
(Métraux 1940:364)	(Blixen 1979:25)

element 10 can be distinguished in its middle, marked with an arrow in the figure. The compact version of the glyphic group depicting anthropomorphs beside an arched object 025 (Figure 5, Bv8) suggests that the ligature 171 may be a fusion of the glyphs 025 and 226 (326), allowing a plausible explanation for the whole group of signs 170-176 (including the ligature 195a.009, line Aa2) that features a hand and a leg appended to the various objects. Finally, ornithomorphic signs 470 and 670, used interchangeably in the discussed passage and several other parallel fragments (e.g. Aa3/Ab2, Ab3/Ab5/Pr3, Ab4/Cb2 (list item v), Br10/Pr8, Bv6/Pv3, Cb13/Pv11, Pr2/ Qr2, Pv5/Pv6/Qv6 (#P sequence), Pv9/Hv7), incline one to consider the head of a long bent neck and a bird head with a long beak to be closely related. Further investigation is required in order to clarify whether or not they may be allographs.

Parallel sequences Bv4 and Sa5, shown in Figure 2, suggest that the sign 159 (specific to the text S) appears allographic to a more common glyph 029, probably with appended compact form of the sign 02. Different spelling variants of the d-list item xxi (Figure 3) tentatively assume that anthropomorphic sign 376, wearing a “backpack,” can be a fusion of glyph 380 and ligature 073.006.

Table 2. Average statistical characteristics of Rapanui songs

Song type	Number	Syllabic length	Word length
Campbell 1971			
Songs for spirits <i>akuaku</i>	9	107	56
Ritual songs <i>riu</i>	42	121	65
Glorification songs <i>ate</i>	3	109	63
Offensive songs <i>'ei</i>	8	80	42
Recitations <i>pata'uta'u</i>	10	201	106
Short recited <i>kai-kai</i>	23	40	21
Expanded <i>kai-kai</i> songs	6	104	56
Blixen 1979			
All <i>kai-kai</i> texts	19	105	53
Short <i>kai-kai</i>	16	55	27

POSSIBLE INSCRIPTION CONTENT

The extremely small size of the proposed "independent text," extracted from the main *rongorongo* tablets, establishes prime importance for the question of inscription contents in assembling the corpus of Rapa Nui texts. As one can see from Figure 1, the "quoted passages" can be rather long (e.g. Aa1, Ab3, Ab7, Bv3/4, Pv11), counting some 40-80 glyph elements. Such passages appear with minor spelling variations in different contexts, including structured lists of the texts A, Bv and Er. It is tempting to look for parallels between these autonomous fragments which are prone to significant rephrasing, and similar spoken constructions of strictly preserved contents, i.e. prayers, charms, or songs. For example, the "tale of Ure a Vai a Nuhe", published in slightly different versions (Fedorova 1978:288-295), features a short song of Ure, also known as a *kai-kai* chant that is about 40 syllables long:

Word order variation in the second line and a few additional words inserted in two last lines in the song transcribed by Métraux do not significantly affect its general layout. Moreover, this song may equally belong to the legend or "*kai-kai* songbook" (that is, a structured list-like inscription), which looks very similar to the situation observed in the *rongorongo* corpus. To verify this hypothesis, a syllabic length analysis of the song corpus was carried out (Campbell 1971, considering only the songs mentioned as "ancient Rapa Nui") and the *kai-kai* corpus (Blixen 1979), thus yielding the results summarized in Table 2.

As one can see, the estimated length of 40-80 glyph elements for the quoted *rongorongo* passages features a good correlation with short *kai-kai* and *'ei* songs. It is worth

mentioning that some *kai-kai* were also used as magical spells or charms (e.g. *Pua te Oheohe*, Blixen 1979:49-53). If one can suggest that medium-sized and almost unchanged passages appearing in different contexts in Easter Island inscriptions could possibly contain short songs such as *kaikai*, they also may represent charms, spells or prayers.

A tentative hypothesis regarding a small variety of *rongorongo* texts reproduced on the surviving tablets (Barthel 1958:168) can be proposed in the light of Barthel's discoveries of decayed wood fragments of *rongorongo* artifacts, buried in the island caves together with human remains (Fischer 1997:236, 525-7). The famous *rongorongo* expert, King Ngaara, is said to have been buried with three tablets (Routledge 1919: 246). Such ritual use of the tablets allows us to suggest that they also might include funerary texts aimed toward helping the soul in its travels through the underworld. Barthel supposed these kinds of inscriptions appeared on the Santiago staff, making it the "Polynesian Book of the Dead" (1990:73).

However, the staff was said to have belonged to the island chief (Fischer 1997:26), that is, a living person, while the state of at least several surviving *rongorongo* artifacts may suggest that they were kept in the caves and were recovered when Fathers Roussel and Zumbohm announced the "call for the tablets" in 1869. If *rongorongo* tablets contained funeral inscriptions, it is natural to expect that they would present slightly different versions of the same text, as happens with Egyptian funeral texts.

CONCLUSIONS

An analysis of transliterated *rongorongo* artifacts, according to the proposed glyph element catalogue, allows us to identify main repetitive patterns and outline the "independent text" where we expect to find more appropriate sign usage statistics, free from distortions rendered along with quoted passages, structured sequences, and lists that constitute roughly a half of the corpus.

Identified repetitive fragments can be used for further investigation concerning allographs and the determination of the proper reading order for the complex ligatures. In the framework of the hypothesis that individual glyph elements may represent Rapa Nui syllables, those lists that are delimited with glyphic group (380.)001.(003, 052) may contain personal names or toponyms, including feature identifiers. Glyph passages that are almost identically quoted in different contexts (including structured lists) can be tentatively associated with short songs (such as *kai-kai* and *'ei*), and also with prayers or charms.

ACKNOWLEDGEMENTS

The author expresses his most sincere gratitude to Steven R. Fischer, Thomas Christopher, Catherine Orliac, and especially to Shawn McLaughlin and Scott Nicolay for their kind help with the photos and literature references of *rongorongo* script.

REFERENCES

- Barthel, T. S. 1958. *Grundlagen zur Entzifferung der Osterinselschrift*. Hamburg: Cram, de Gruyter.
- Barthel, T. S. 1962. Easter Island place-names, *JSO* 18: 100-107.
- Barthel, T. S. 1990. Wege durch die Nacht: Rongorongo Studien auf dem Santiagostab. *State and Perspectives of Scientific Research in Easter Island Culture*. Esen-Baur H.-M., ed. :73-112. Frankfurt: Senckenbergische Natur-forschende Gesellschaft.
- Blixen, O. 1979. Figuras de hilo tadicionales de la isla de Pascua y sus correspondientes salmodias. *Moana* (Montevideo) 2:1-106.
- Butinov, N. A. and Yu. V. Knorozov, 1956. Preliminary Report on Studies of Easter Island Script. *Soviet Ethnography* 4:76-91. [in Russian]
- Campbell, R. 1999. *Mito y Realidad Rapa Nui*. Santiago: Editorial Andres Bello.
- Campbell, R. 1971. *La herencia musical de Rapanui*. Santiago: Editorial Andres Bello.
- Chauvet, S. 1945. *La Isla de Pascua y Sus Misterios*. Santiago: Zig-zag.
- Cristino, C., P. Vargas and R. Izaurieta. 1981. *Atlas Arqueológico de Isla de Pascua*. Santiago: Corporacion TOESCA.
- Du Feu, V. 1996. *Rapanui*. Descriptive Grammars. London and New York: Routledge.
- Englert, S. 1948. *La Tierra de Hotu-Matua: Historia, Et-nologia y Lengua de la Isla de Pascua*. Padre Las Casas: Edit. "San Francisco".
- Fedorova, I. K. 1978. *Myths, Lore and Legends of Easter Island*, Moscow: Nauka. [in Russian]
- Fedorova, I. K. 1982. *Investigation of Rapanui Texts. Forgotten Writing Systems*, Moscow: Nauka, 23-98. [in Russian]
- Fischer, S. R. 1997. *Rongo-rongo: The Easter Island Script. History, Traditions, Texts*. Oxford: Calderon Press.
- Guy, J. B. M. 1982. Fused glyphs in the Easter Island script. *Journal of the Polynesian Society* 91:445-47.
- Guy, J. B. M. 1985. On a fragment of the "Tahua" tablet. *Journal of the Polynesian Society* 94:367-88.
- Guy, J. B. M. 2006. General properties of the rongorongo writing. *Rapa Nui Journal* 20:53-66.
- Heyerdahl, T. 1975. *Art of Easter Island*, New York [Russian: 1982. Moscow: Iskuststvo]
- Horley, P. P. 2005. Allographic variations and statistical analysis of the rongorongo script. *Rapa Nui Journal* 19:107-116.
- Kjellgren, E. 2001. *Splendid Isolation*. New York: The Metropolitan Museum of Art.
- Marwan, N. and J. Kurths, 2002. Nonlinear analysis of bivariate data with cross recurrence plots. *Physics Letters A* 302:299-307.
- Mètraux, A. 1940. *Ethnology of Easter Island*. Honolulu: Bishop Museum Press.
- Nicolay, S. 2001. Structure and content of the Easter Island Inscriptions. Manuscript in the collection of the author.
- Pozdniakov, K. 1996. Les bases du déchiffrement de l'écriture de l'île de Pâques. *JSO* 103/2:289-303.
- Sproat, R. 2003. Approximate string matches in rongorongo corpus. <http://compling.ai.uiuc.edu/rws/ror>
- Routledge, K. 1914-15. Field notes, Reel 2, notebook.
- Routledge, K. 1919. *The Mystery of Easter Island*. London: Hazell, Watson and Viney.
- Van Hoorebeeck, A. 1979. *Le vérité sur l'île de Pâques*. Le Havre: Pierrette d'Antoine Editeur.